

**Abstract of the Disclosure**

A pulse sequence is configured by making a pulse waveform output from a pulse light source into a super  
5 Gaussian pulse of the third order or higher, and input  
to a spectrum expanding device. The spectrum expanding  
device broadens the spectrum of the pulse sequence with  
a nonlinear medium. A modulator array extracts  
longitudinal mode components from the expanded spectrum,  
10 and modulates the extracted longitudinal mode components  
with modulation data. Lastly, the modulated longitudinal  
mode components are coupled and transmitted to a  
transmission line.